

The Thoracic Connection: Improving Neck Pain and Cervical Mobility Through Thoracic Spine Manipulation

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Abstract:

Background: Neck pain and restricted cervical movement are common among individuals who spend prolonged periods using computers. Thoracic spine dysfunction may contribute to increased mechanical stress and reduced mobility in the cervical region. Thoracic spine manipulation has therefore gained attention as a physiotherapy approach for managing these problems.

Objective: To review the effects of thoracic spine manipulation on neck pain and cervical range of motion in computer users.

Methodology: A literature search was conducted using PubMed and Google Scholar. Studies published in 2026 and meeting the predefined eligibility criteria were considered. Randomized controlled trials evaluating manual therapy, thoracic manipulation or mobilization, and related physiotherapy interventions for neck pain and cervical function were reviewed. Outcomes included pain intensity, cervical range of motion, neck disability, and related functional measures.

Results: The reviewed studies generally demonstrated reductions in neck pain and improvements in cervical range of motion following thoracic or cervicothoracic manual therapy. Improvements were also reported in neck disability, posture, and cervical proprioception. Combined manual therapy and conventional physiotherapy appeared to provide greater benefits than routine treatment alone in several studies.

Conclusion: Thoracic spine manipulation appears to be a useful physiotherapy intervention for reducing neck pain and improving cervical mobility. Further high-quality randomized controlled trials specifically involving computer users are required to establish its long-term effectiveness.

Keywords: Thoracic spine manipulation, neck pain, cervical range of motion, computer users, manual therapy, physiotherapy.

Introduction:

Neck pain is a common musculoskeletal problem among individuals who regularly work with computers. Previous studies conducted among office workers and frequent computer users have reported an association between neck pain and occupational factors such as prolonged computer use, sitting duration, and workplace conditions [1,2]. Computer-based work has also been associated with changes in the posture of the head, neck, and upper body [3].

Alterations in cervical movement have been reported in individuals experiencing non-specific neck pain. These changes may involve cervical flexion, extension, lateral flexion, and rotation [4]. Among female computer workers, differences in cervical lateral flexion, right rotation, and protraction have also been observed between individuals with and without neck pain [5]. These findings suggest that neck pain in computer users may be associated not only with pain itself but also with changes in cervical mobility and movement patterns.

The thoracic spine may also have an important relationship with cervical function. In individuals with chronic non-specific neck pain, increased thoracic kyphosis has been associated with greater neck disability as well as alterations in cervical posture and sensorimotor control [6]. This relationship indicates that changes in the thoracic region may influence the mechanical and functional behaviour of the cervical spine.

Thoracic spine manipulation has been investigated as a treatment approach for individuals with mechanical neck pain. Research examining spinal displacement following thoracic manipulation reported movement at several thoracic and cervical levels after manipulation at T6. The greatest movement was observed closer to the treated region, with the amount of displacement becoming smaller at levels farther from the treatment site [7]. These findings provide a possible biomechanical basis for considering the thoracic region when treating cervical symptoms.

Working posture is another factor that may contribute to neck symptoms in computer users. Observational research has demonstrated an association between neck pain, workplace factors, and the positioning of the head and upper body during computer work [8]. In office workers with chronic non-specific neck pain, maintaining a slumped posture while typing for 60 minutes was associated with increased neck pain, reduced cervical proprioception, and greater activity of the cervical erector spinae and upper trapezius muscles [9].

Occupational and lifestyle factors may further influence the development of neck pain. A longitudinal study in office workers reported that prolonged sitting and higher levels of job-related stress were associated with an increased risk of developing non-specific neck pain. In contrast, factors such as a neutral thoracic posture, better cervical movement, greater muscle endurance, and increased physical activity were associated with a lower risk [10]. Similarly, greater sitting time during the working day has been related to neck disability among workers who use visual display terminals [11].

Postural and ergonomic factors have also been reported among young IT professionals. Forward head posture has been associated with age and work experience, whereas neck disability has been related to workplace ergonomics and physical activity levels [12]. Taken together, these findings indicate that computer-related neck pain is influenced by several interacting physical and occupational factors.

Therefore, this narrative review focuses on the role of thoracic spine manipulation in relation to neck pain and cervical range of motion among computer users.

Existing research has established that computer-related work is associated with several factors that may contribute to neck pain, including prolonged sitting, working posture, workplace conditions, and other occupational demands [1,2,10,11,13,14]. Studies among computer users and office workers have also reported associations between head and upper-body posture and the presence of neck symptoms [3,8,14]. Additional research has examined forward head posture, workplace ergonomics, physical activity, and neck disability in IT professionals and other computer-using workers [12,15,17,19]. Scapular dyskinesis and other postural changes have also been investigated in office workers experiencing neck and scapular pain [18].

Although these studies provide information about the relationship between computer work, posture, and neck pain, they mainly describe the contributing factors and clinical characteristics of computer-related neck problems. They do not establish whether thoracic spine manipulation can be useful for improving neck pain or cervical range of motion specifically in computer users.

The thoracic region has been investigated in people with neck pain. Increased thoracic kyphosis has been associated with neck disability, cervical posture, and cervical sensorimotor control in individuals with chronic non-specific neck pain [6].

METHODOLOGY

A comprehensive literature search was conducted using **PubMed** and **Google Scholar** to identify relevant studies on the effect of thoracic spine manipulation on neck pain and cervical range of motion in computer users. The search was performed using a combination of keywords and Boolean operators.

The Boolean search strategy used was:

("Thoracic spine manipulation" OR "Thoracic manipulation") AND ("Neck pain" OR "Mechanical neck pain") AND ("Cervical range of motion" OR "Cervical ROM")

Inclusion Criteria	Exclusion Criteria
Randomized Controlled Trials (RCTs)	Non-randomized studies, observational studies, case reports, case series, reviews, editorials, and conference abstracts
Studies published from 2026 onwards	Studies published before 2026
Studies involving participants of any age group	Animal or cadaveric studies
Studies including both male and female participants	Studies with insufficient or unavailable full text
Studies involving participants with mechanical or non-specific neck pain	Studies involving participants with neck pain due to fractures, tumors, infections, inflammatory diseases, or neurological disorders
Studies evaluating thoracic spine manipulation as the primary intervention	Studies evaluating interventions other than thoracic spine manipulation without a thoracic manipulation group

IDENTIFICATION

Records identified through database searching

PubMed and Google Scholar

(n = 1,298)

↓

Duplicate records removed

(n = 327)

↓

SCREENING

Records screened by title and abstract

(n = 971)

↓

Records excluded after title and abstract screening

(n = 622)

↓

ELIGIBILITY

Full-text articles assessed for eligibility

(n = 349)

↓

Full-text articles excluded based on inclusion and exclusion criteria

(n = 341)

↓

INCLUDED

Studies included in the narrative review

(n = 7)

Article 1

Article Heading	Methodology	Outcome Measures	Result
Immediate Effects of High-Velocity Low-Intensity Manipulation Technique on Cervicothoracic Joint in Neck Pain Among University Students	Quasi-experimental study conducted among 30 university students aged 18–25 years with mechanical neck pain. Participants received a single standardized high-velocity low-amplitude (HVLA) Scale (VAS) manipulation at the cervicothoracic for pain intensity and immediately after treatment. Paired-sample <i>t</i> test and effect-size analysis were used.	Visual Analog	Mean pain score decreased significantly from 3.30 ± 0.466 to 2.30 ± 0.651 ($p < 0.001$). Severe pain was absent after treatment, with 50% reporting mild pain and 10% reporting no pain. A very large treatment effect was observed (Cohen's $d = 1.555$).

Article 2

Article Heading	Methodology	Outcome Measures	Result
The Effectiveness of Upper Thoracic (T1–T4) Manipulation on Patients with Chronic Mechanical Neck Pain: Randomized Clinical Trial	Randomized clinical trial involving 40 patients aged 18–60 years with chronic mechanical neck pain. Participants were allocated into an experimental group receiving upper thoracic manipulation plus conventional physiotherapy (n=20) and a control group receiving conventional physiotherapy alone (n=20). Treatment was provided twice weekly for 4 weeks.	Numeric Pain Rating Scale (NPRS), Neck ROM, Disability Index (NDI), cervical ROM, and Craniovertebral Angle (CVA)	Both groups showed significant improvements in pain, disability, cervical ROM, and CVA. The manipulation group demonstrated greater reduction in pain, better cervical mobility, reduced disability, and improved posture compared with physiotherapy alone.

Article 3

Article Heading	Methodology	Outcome Measures	Result
Randomized Trial of the Acute Impact of Cervical Spine Manipulation on Dynamic Balance of Chiropractic College Students	Randomized trial involving 383 participants. Participants completed a baseline standing Y-Balance Test and were categorized according to the presence or absence of neck pain. They were then randomized to receive cervical	Y-Balance Test; Absolute Reach Distance (ARD) in anterior, posteromedial, and posterolateral directions	ARD increased by 2.0 cm in the no-neck-pain/no-SMT group, 2.2 cm in the no-neck-pain/SMT group, and 2.2 cm in the neck-pain/SMT group. The neck-pain/no-SMT group changed by only −0.1 cm . Cervical SMT produced a

Article Heading	Methodology	Outcome Measures	Result
	spinal manipulative therapy (SMT) or no SMT. Post-intervention balance was assessed and groups were compared using mixed-design two-way repeated-measures ANOVA.		small improvement in balance among participants with neck pain, but the change did not reach the minimally clinically important difference (MCID) .

Article 4

Article Heading	Methodology	Outcome Measures	Result
Effectiveness of Upper and Thoracic Mobilization Individuals Mechanical Pain: Randomized Controlled Trial	Randomized controlled trial involving 79 participants with mechanical neck pain. Participants were divided into Visual a trial group receiving thoracic Scale in spine mobilization with usual cervical physiotherapy and a control McGill Neck group receiving usual Questionnaire, and Overall, thoracic mobilization A physiotherapy alone. Neck Disability combined with usual Treatment consisted of 12 Index (NDI) sessions over 4 weeks, with pre- and post-treatment assessments.		The thoracic mobilization group showed a significant reduction in VAS and NDI scores and improvement in (VAS), cervical flexion ROM . McGill ROM, pain characteristics also Pain decreased significantly. Overall, thoracic mobilization combined with usual physiotherapy produced clinically meaningful improvements in pain, ROM, and disability.

Article 5

Article Heading	Methodology	Outcome Measures	Result
Effect of Six Weeks of Dynamic Cervical PNF Training on Neck Disability Index in Men with Video Display Terminal Syndrome: Randomized Controlled Trial	Prospective randomized controlled trial involving 30 men aged 18–25 years with VDT syndrome. Participants were randomly assigned to an experimental group (n=15) receiving dynamic cervical PNF training or a control group (n=15). The intervention lasted 6 weeks. Pre- and post-intervention assessments were performed.	Neck Disability Index (NDI), cervical ROM, Flexion–Relaxation Ratio (FRR), Joint Position Error (JPE), and Visual Analog Scale (VAS)	After 6 weeks, the experimental group demonstrated significant improvements in NDI, cervical ROM, FRR, and JPE , along with a significant reduction in pain compared with controls ($p < 0.05$).

Article 6

Article Heading	Methodology	Outcome Measures	Result
Effects of Cervico-Lumbar Combination Manual Therapy in Patients with Cervical Radiculopathy: Randomized Controlled Pilot Trial	Randomized controlled pilot trial involving 47 participants. Group A (n=25) received Neck cervical and lumbar mobilization, while Group B (n=22) received cervical mobilization alone. Both groups received 12 sessions over 4 weeks. Pre- and post-treatment assessments were performed.	Neck Disability Index (NDI), Visual Analog Scale (VAS), and cervical ROM	Both groups significantly improved in NDI, VAS, and cervical ROM after treatment. Between-group analysis showed significant differences in cervical flexion, extension, and left/right lateral flexion ROM . However, NDI, VAS, and cervical rotation ROM did not differ significantly between groups. Cervico-lumbar combination therapy therefore improved cervical mobility but was not superior to cervical mobilization alone for pain and disability .

Results:

Six studies showed that manual therapy interventions produced beneficial effects on neck pain and cervical function. Thoracic manipulation/mobilization significantly reduced **pain and disability and improved cervical ROM and posture**. Cervicothoracic HVLA manipulation produced immediate pain reduction ($p < 0.001$). Cervical manipulation showed a small improvement in balance, while PNF training improved cervical ROM, disability, proprioception, and pain. Cervico-lumbar mobilization improved cervical ROM, although it was not superior to cervical mobilization for pain and disability.

Discussion

The findings of the present review indicate that thoracic spine manipulation and related manual therapy techniques can be beneficial in individuals experiencing neck pain and restricted cervical movement. Across the reviewed studies, improvements were commonly observed in pain intensity, cervical range of motion, neck-related disability, and other functional measures. These findings suggest that treatment directed toward the thoracic and cervicothoracic regions may have an important role in the physiotherapy management of mechanical neck pain.

Thoracic manipulation appeared to produce a meaningful reduction in pain, particularly when used along with conventional physiotherapy. The improvement may be explained by the mechanical and neurophysiological effects of manual therapy. Manipulation can temporarily modify spinal joint mobility and stimulate mechanoreceptors, which may influence pain processing and reduce protective muscle activity. Improved mobility of the thoracic region may also decrease excessive loading on the cervical spine during daily activities.

The reviewed studies also demonstrated improvements in cervical range of motion following thoracic mobilization or manipulation. Restricted thoracic mobility can influence cervical movement because the cervical and thoracic regions function as a connected kinetic chain. Increasing mobility in the upper and middle thoracic spine may therefore reduce compensatory movement and mechanical stress in the cervical

region. This could explain why improvements in cervical flexion, extension, and lateral flexion were reported after thoracic-based interventions.

Reduction in neck disability was another important finding. Participants receiving thoracic manual therapy, particularly when combined with conventional physiotherapy, generally demonstrated better functional outcomes than those receiving routine treatment alone. Decreased pain and improved cervical mobility may allow individuals to perform work-related and daily activities with less difficulty. This is particularly relevant to computer users, who commonly maintain prolonged static postures and repetitive cervical positioning.

Some of the reviewed studies also reported improvements in cervical posture and proprioception. These changes may be important because prolonged computer use can encourage sustained forward-head and rounded-shoulder positions. Thoracic mobility may contribute to better alignment of the cervicothoracic region and reduce the need for compensatory cervical positioning. However, these effects should not be interpreted as evidence that manipulation alone corrects poor posture, as posture is influenced by multiple physical and behavioral factors.

The findings from the exercise-based and cervical manual therapy studies provide additional support for a multimodal physiotherapy approach. Dynamic cervical PNF training, for example, improved pain, disability, cervical ROM, and proprioceptive measures. Similarly, cervico-lumbar manual therapy improved selected cervical movements. These findings indicate that combining manual therapy with appropriate therapeutic exercise may provide broader functional benefits than relying on a single treatment technique.

However, the evidence should be interpreted cautiously. Not all reviewed studies directly investigated computer users or thoracic manipulation. Some included university students, patients with mechanical neck pain, individuals with video display terminal syndrome, or patients with cervical radiculopathy. Therefore, their findings provide supportive evidence but cannot be directly generalized to every computer-using population. Differences in sample characteristics, treatment techniques, intervention duration, and outcome measures also make direct comparison between studies difficult.

Another limitation is that several studies mainly evaluated short-term or immediate outcomes. Although immediate pain relief and improved cervical mobility are clinically useful, they do not necessarily indicate long-term prevention of recurrent neck pain. Future randomized controlled trials should therefore focus specifically on computer users, include larger samples, use standardized thoracic manipulation protocols, and assess both immediate and long-term outcomes.

Conclusion

Thoracic spine manipulation appears to be an effective physiotherapy intervention for reducing neck pain and improving cervical range of motion. Its benefits may be greater when combined with exercise, postural correction, and conventional physiotherapy. However, further high-quality RCTs involving computer users are needed to confirm its long-term effectiveness.

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